SEQUENCE LISTING

<110> The Regents of the University of California

<120> SITE SPECIFIC LISTERIA INTEGRATION
VECTORS AND METHODS FOR USING THE SAME

<130> BERK-017WO

<150> 10/136,860
<151> 2002-04-30

<160> 28

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 1
ggacgtcatt aaccctcact aaagg   25

<210> 2
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 2
ggacgtcaat acgactcact atagg   25

<210> 3
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 3
ggacgtcgct atttaacgac cctgc   25

<210> 4
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 4
gagctgcagg agaattacaa cttatatcgt atgggg   36

```
<210> 5
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 5
gcactgcagc cgcttgccct catctgttac gcc                          33

<210> 6
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 6
catgcatgcc tctcgcctgt cccctcagtt cag                          33

<210> 7
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 7
gtagatctta actttccatg cgagaggag                               29

<210> 8
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 8
gggcatgcga taaaaagcaa tctatagaaa aacagg                       36

<210> 9
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 9
cctaagcttt cgatcatcat aattctgtc                               29

<210> 10
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide
```

<400> 10
gggcatgcag atctttttt cagaaaatcc cagtacg   37

<210> 11
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 11
ggtctagatc aagcacatac ctag   1

<210> 12
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 12
cgggatcctg aagcttggga agcag   25

<210> 13
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 13
ctcatgaact agaaaaatgt gg   22

<210> 14
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 14
tgaagtaaac ccgcacacga tg   22

<210> 15
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 15
tgtaacatgg aggttctggc aatc   24

<210> 16
<211> 24
<212> DNA

<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 16
acataatcag tccaaagtag atgc   24

<210> 17
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 17
acgaatgtaa atattgagcg g   1

<210> 18
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 18
gaagatctcc aaaaataaac aggtggtgg   29

<210> 19
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 19
catgcatgcg tggagggaaa gaagaacgc   29

<210> 20
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 20
ggagggaaag aagaacgc   18

<210> 21
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 21
tatcagacct aacccaaacc ttcc   24

```
<210> 22
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 22
aatcgcaaaa taaaaatctt ctcg                                              4

<210> 23
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> oligonucleotide

<400> 23
gtcaaaacat acgctcttat c                                                21

<210> 24
<211> 6101
<212> DNA
<213> Shuttle integration vector pPL1

<220>
<221> misc_feature
<222> 3676
<223> n = A,T,C or G

<400> 24
gacgtcaata cgactcacta tagggcgaat tgggtaccgg gccccccctc gaggtcgacg   60
gtatcgataa gcttgatatc gaattcctgc agcccggggg atccactagt tctagagcgg  120
ccgccaccgc ggtggagctc cagcttttgt tccctttagt gagggttaat gacgtcgcta  180
tttaacgacc ctgccctgaa ccgacgaccg ggtcgaattt gctttcgaat ttctgccatt  240
catccgctta ttatcactta ttcaggcgta gcaccaggcg tttaagggca ccaataactg  300
ccttaaaaaa attacgcccc gccctgccac tcatcgcagt actgttgtaa ttcattaagc  360
attctgccga catggaagcc atcacagacg gcatgatgaa cctgaatcgc cagcggcatc  420
agcaccttgt cgccttgcgt ataatatttg cccatggtga aaacggggc gaagaagttg  480
tccatattgg ccacgtttaa atcaaaactg gtgaaactca cccagggatt ggctgagacg  540
aaaaacatat tctcaataaa ccctttaggg aaataggcca ggttttcacc gtaacacgcc  600
acatcttgcg aatatatgtg tagaaactgc cggaaatcgt cgtggtattc actccagagc  660
gatgaaaacg tttcagtttg ctcatggaaa acggtgtaac aagggtgaac actatcccat  720
atcaccagct caccgtcttt cattgccata cggaattccg gatgagcatt catcaggcgg  780
gcaagaatgt gaataaaggc cggataaaac ttgtgcttat ttttctttac ggtctttaaa  840
aaggccgtaa tatccagctg aacggtctgg ttataggtac attgagcaac tgactgaaat  900
gcctcaaaat gttctttacg atgccattgg gatatatcaa cggtggtata tccagtgatt  960
ttttctcca ttttagcttc cttagctcct gaaaatctcg ataactcaaa aaatacgccc 1020
ggtagtgatc ttatttcatt atggtgaaag ttggaacctc ttacgtgccg atcaacgtct 1080
cattttcgcc aaaagttggc ccaggcttc ccggtatcaa cagggacacc aggatttatt 1140
tattctgcga agtgatcttc cgtcacaggt atttattcgg cgcaaagtgc gtcgggtgat 1200
gctgccaact tactgattta gtgtatgatg gtgtttttga ggtgctccag tggcttctgt 1260
ttctatcagc tgtccctcct gttcagctac tgacggggtg gtgcgtaacg gcaaaagcac 1320
cgccggacat cagcgctagc ggagtgtata ctggcttact atgttggcac tgatgagggt 1380
gtcagtgaag tgcttcatgt ggcaggagaa aaaaggctgc accggtgcgt cagcagaata 1440
tgtgatacag gatatattcc gcttcctcgc tcactgactc gctacgctcg gtcgttcgac 1500
tgcggcgagc ggaaatggct tacgaacggg gcggagattt cctggaagat gccaggaaga 1560
tacttaacag ggaagtgaga gggccgcggc aaagccgttt ttccataggc tccgcccccc 1620
tgacaagcat cacgaaatct gacgctcaaa tcagtggtgg cgaaacccga caggactata 1680
```

```
aagataccag gcgtttcccc ctggcggctc cctcgtgcgc tctcctgttc ctgcctttcg 1740
gtttaccggt gtcattccgc tgttatggcc gcgtttgtct cattccacgc ctgacactca 1800
gttccgggta ggcagttcgc tccaagctgg actgtatgca cgaacccccc gttcagtccg 1860
accgctgcgc cttatccggt aactatcgtc ttgagtccaa cccggaaaga catgcaaaag 1920
caccactggc agcagccact ggtaattgat ttagaggagt tagtcttgaa gtcatgcgcc 1980
ggttaaggct aaactgaaag gacaagtttt ggtgactgcg ctcctccaag ccagttacct 2040
cggttcaaag agttggtagc tcagagaacc ttcgaaaaac cgccctgcaa ggcggttttt 2100
tcgttttcag agcaagagat tacgcgcaga ccaaaacgat ctcaagaaga tcatcttatt 2160
aatcagataa aatatttcta gatttcagtg caatttatct cttcaaatgt agcacctgaa 2220
gtcagcccca tacgatataa gttgtaattc tccgccgctt gccctcatct gttacgccgg 2280
cggtagccgg ccagcctcgc agagcaggat tcccgttgag caccgccagg tgcgaataag 2340
ggacagtgaa gaaggaacac ccgctcgcgg gtgggcctac ttcacctatc ctgcccggct 2400
gacgccgttg gatacaccaa ggaaagtcta cacgaaccct ttggcaaaat cctgtatatc 2460
gtgcgaaaaa ggatggatat accgaaaaaa tcgctataat gaccccgaag caggggttatg 2520
cagcggaaaa gcgctgcttc cctgctgttt tgtggaatat ctaccgactg gaaacaggca 2580
aatgcaggaa attactgaac tgaggggaca ggcgagaggc atgcgataaa aagcaatcta 2640
tagaaaaaca ggttactttt tatttataat tttagtttct cgattcgttt ccgtccaacg 2700
agagaaaacg aggaactaaa caatctaaat aaacaagcta ctagagccat tcaatagtaa 2760
cttgttcacc gtcaatataa atttattaa ttagtgattt taaataaagt tgcttttctc 2820
ggaactctaa agagtcaaaa tcaactgttg ctaaatcagc taaattttct tgtatctttt 2880
tatttttctt caattcttcg ttagcttcta tttgtgcttc ataataatta atttgagcat 2940
cgatatcagc catcatagca tcaagttctg aaacttcgta agaaccgctg atatataaat 3000
caaatagccg tttctttttt acgtgttctg ttttaagttt ttcatttaag ctatctaatt 3060
cgtcttcttt atctacattc ctagaagcga aactatagtt attcacgcga tcaataatta 3120
attcctcgag tttgtcagct ctccaaattt tatttccaca ttttttctagt tcatgagtat 3180
gtttgtaagt cttgcaacta taatatctat aatgatattt ttttccgcgg gaaacagtat 3240
cttttctccg atgaacaaaa cccaacccac attttccaca cactaccaaa ttatttagca 3300
acgatgctga atctctattc atatttggat ttttacccat gcgagaaaaa atttcttgaa 3360
ctcgataaaa ttgttcctct gaaataatag gctcatgaac acctttgta tgcactttat 3420
ccgcataaga tacataacca cagtataaat cattagttag ccaattgttg taactgctat 3480
atgatttcac tttgaatcct aatttttta gtctcttctg taaagtggta atgctttttt 3540
cttcctcaaa aatatcataa atcatttgta attgttttgc ttcttcttca ttaatatata 3600
atttagtatc tataacatca tagccgaatg ttctaccttt tgcagtcgtt aaaggaagac 3660
ctgcttcaat acgctnaatt ttccccatca ccatacgatc acgtatagtt tcgcgctcta 3720
attgagcaaa tacggataat ataccaatca tcgcgcgccc aaatgggcta gaggtgtcaa 3780
gagtttcaga caaactaaca aattctacat tgttttttaa gaagtattct tcaataagcg 3840
ttatcgtatc tctttgtgag cgggaaagtc tatctaagcg atatacaaca acagcatcaa 3900
tttcatgtaa tttacttagc atttcattta gtgcggggcg attcatgttt gaaccgctgt 3960
atccgccgtc tatgaaaata tcgtatacgt cccaatcctt cgagcggcac aaggctgtta 4020
gcttttcagt ttgagcttgt atagagtaat tctctatttg ttcttgagta gatacgcgta 4080
tataaatagc tgccttcatt tccgttctcc tctcgcatgg aaagttaaga tctttttttc 4140
agaaaatccc agtacgtaat taagtatttg agaattaatt ttatattgat taatactaag 4200
tttacccagt tttcacctaa aaaacaaatg atgagataat aactccaaag gctaaagagg 4260
actataccaa ctatttgtaa taattctgta acagttgaaa agcgaacgtg tattcttagg 4320
gcttgagatg tactgctggg taaacctta tagtgtaagt gggatgtgaa cgttaatcaa 4380
caactttcgc tatgggaaac ctattgtttt ttgttaatag aaaaacttaa tacatttgta 4440
atataaaaac cggcagtttt tccgttcttc gtgactcgaa atgaattgcc agatgagttt 4500
atggtattct ataatagaag gtatggagga tgttatataa tgagacagaa ttatgatgat 4560
cgaaagctag cttggcactg gccgtcgttt tacaacgtcg tgactgggaa aaccctggcg 4620
ttacccaact taatcgcctt gcagcacatc cccctttcgc cagctggcgt aatagcgaag 4680
aggcccgcac cgatcgccct tcccaacagt tgcgcagcct gaatggcgaa tggcgcctga 4740
tgcggtattt tctccttacg catctgtgcg gtatttcaca ccgcatatca aatggttcgg 4800
atctggagct gtaatataaa aaccttcttc aactaacggg gcaggttagt gacattagaa 4860
aaccgactgt aaaaagtaca gtcggcatta tctcatatta taaaagccag tcattaggcc 4920
tatctgacaa ttcctgaata gagttcataa acaatcctgc atgataacca tcacaaacag 4980
aatgatgtac ctgtaaagat agcggtaaat atattgaatt acctttatta atgaattttc 5040
ctgctgtaat aatgggtaga aggtaattac tattattatt gatatttaag ttaaacccag 5100
taaatgaagt ccatggaata atagaaagag aaaaagcatt ttcaggtata ggtgttttgg 5160
gaaacaattt ccccgaacca ttatatttct ctacatcaga aaggtataaa tcataaaact 5220
ctttgaagtc attctttaca ggagtccaaa taccagagaa tgttttagat acaccatcaa 5280
aaattgtata aagtggctct aacttatccc aataacctaa ctctccgtcg ctattgtaac 5340
cagttctaaa agctgtattt gagtttatca cccttgtcac taagaaaata aatgcagggt 5400
```

```
aaaatttata tccttcttgt tttatgtttc ggtataaaac actaatatca atttctgtgg 5460
ttatactaaa agtcgtttgt tggttcaaat aatgattaaa tatctctttt ctcttccaat 5520
tgtctaaatc aattttatta aagttcattt gatatgcctc ctaaattttt atctaaagtg 5580
aatttaggag gcttacttgt ctgctttctt cattagaatc aatccttttt taaaagtcaa 5640
tattactgta acataaatat atattttaaa aatatcccac tttatccaat tttcgtttgt 5700
tgaactaatg ggtgctttag ttgaagaata aagaccacat taaaaaatgt ggtcttttgt 5760
gtttttttaa aggatttgag cgtagcgaaa aatccttttc tttcttatct tgataataag 5820
ggtaactatt gcccagatcc gaaccatttg atatggtgca ctctcagtac aatctgctct 5880
gatgccgcat agttaagcca gccccgacac ccgccaacac ccgctgacgc gccctgacgg 5940
gcttgtctgc tcccggcatc cgcttacaga caagctgtga ccgtctccgg gagctgcatg 6000
tgtcagaggt tttcaccgtc atcaccgaaa cgcgcgagac gaaagggcct cgtgatacgc 6060
ctattttat aggttaatgt catgataata atggtttctt a                      6101
<210> 25
<211> 3897
<212> DNA
<213> Bacteriophage U153

<220>
<221> misc_feature
<222> 695
<223> n = A,T,C or G

<400> 25
aagctttaaa gaaattcaag aagaaacatc ggtaactagc cataaattaa ccaaagttct 60
aatctcgctt gaagagaaca aactgattga aaaaattgga caatctagag caacaaaata 120
caaattaatt gaatctacag aggaatatct aaccaatctt caacacacat ttcgaaaaat 180
tgttcaattt tatgttgaaa atgataaata aaaatatgaa tgttttttta tttgttagta 240
gtgtaacttt ccatgcgaga ggagaacgga aatgaaggca gctatttata tacgcgtatc 300
tactcaagaa caaatagaga attactctat acaagctcaa actgaaaagc taacagcctt 360
gtgccgctcg aaggattggg acgtatcga tattttcata gacggcggat acagcggttc 420
aaacatgaat cgccccgcac taaatgaaat gctaagtaaa ttacatgaaa ttgatgctgt 480
tgttgtatat cgcttagata gactttcccg ctcacaaaga gatacgataa cgcttattga 540
agaatacttc ttaaaaaaca atgtagaatt tgttagtttg tctgaaactc ttgacacctc 600
tagcccattt gggcgcgcga tgattggtat attatccgta tttgctcaat tagagcgcga 660
aactatacgt gatcgtatgg tgatggggaa aattnagcgt attgaagcag gtcttccttt 720
aacgactgca aaaggtagaa cattcggcta tgatgttata gatactaaat tatatattaa 780
tgaagaagaa gcaaaacaat tacaaatgat ttatgatatt tttgaggaag aaaaaagcat 840
taccacttta cagaagagac taaaaaaatt aggattcaaa gtgaaatcat atagcagtta 900
caacaattgg ctaactaatg atttatactg tggttatgta tcttatgcgg ataaagtgca 960
tacaaaaggt gttcatgagc ctattatttc agaggaacaa ttttatcgag ttcaagaaat 1020
tttttctcgc atgggtaaaa atccaaatat gaatagagat tcagcatcgt tgctaaataa 1080
tttggtagtg tgtggaaaat gtgggttggg ttttgttcat cggagaaaag atactgtttc 1140
ccgcggaaaa aaatatcatt atagatatta tagttgcaag acttacaaac atactcatga 1200
actagaaaaa tgtggaaata aaatttggag agctgacaaa ctcgaggaat taattattga 1260
tcgcgtgaat aactatagtt tcgcttctag gaatgtagat aaagaagacg aattagatag 1320
cttaaatgaa aaacttaaaa cagaacacgt aaaaaagaaa cggctatttg atttatatat 1380
cagcggttct tacgaagttt cagaacttga tgctatgatg gctgatatcg atgctcaaat 1440
taattattat gaagcacaaa tagaagctaa cgaagaattg aagaaaaata aaaagataca 1500
agaaaattta gctgatttag caacagttga ttttgactct ttagagttcc gagaaaagca 1560
actttatttta aaatcactaa ttaataaaat ttatattgac ggtgaacaag ttactattga 1620
atggctctag tagcttgttt atttagattg tttagttcct cgttttctct cgttggacgg 1680
aaacgaatcg agaaactaaa attataaata aaaagtaacc tgttttttcta tagattgctt 1740
tttatcaatt atatagaaga aagccgcttt ttattagatt ataattgatg ttttttgatt 1800
tatatttcac tccctgtgca aataatgata taacagcaac ctcgaacttt ttagttcggg 1860
gtattttttt gaaattaatt tataaaaaca cttgcaatta tataatacat gtattataat 1920
ataaatatag aaaggagttg agaaagtgaa agacatctta gaggaaataa aaacagtcct 1980
tgaaattgta actcttgcag tagcgctgat aacattacgc aagatagaca aaaacaagga 2040
caagtaacca gaggggtgaa actcccctcc ctctataaaa gtatatcacg tctttcataa 2100
attatgaata aatatatctg ggttatatta attgttatat gcgttaacgg actcgctagt 2160
tactttcaga acacagcatt gaccatcatt gctatactga ctacattagc ttgtttagta 2220
tatttaataa aaaataggaa gtgattaatt atgacgaaaa aaacgacctc tgacgcgcag 2280
ttgaaagcaa ataaggaatg gcaaagcaag aacaagaac atgcaaacta tttaaaatct 2340
```

```
cgttcagctg cgcgttcttt tataaagaat aaagctacgt tggaagattt gaaggaactt 2400
gaaaaattaa ttatagaggg aaaaattaat cataagggaa tgattaagga taaatgatgc 2460
acgctaagca catgcttggc gttttttgca taaaaaaagc cctaacgttg aagttaggga 2520
ctgacatata taaaaaatag aagttgacaa ctttaaggcg actaccacga caggcagctt 2580
acaagctatg actagccttg actaatcatt tatgcgacac tcaaagaatt attatctaac 2640
ttcttaatca agaataacaa aaatcaaaca agttagcaag tatttcaggc attttatttta 2700
taacaaatat ctagatcaca aaaatgtcgc ggaaataat ggtcacaacc aatattacat 2760
aaacttaaaa gttctctatt tctcttatca ggttatgtg ctgttacgtg atttctacat 2820
actctaaaaa ctgtattagc gaataagtct acaacttgaa ttaaatcttt attttgtgaa 2880
tccttatatg atgtttcaac agaagagaaa attggatgtt ccattgtaaa tttaatagtt 2940
aaatattctt gtaagctatt taatgattca attgcggtat ttctatcatc tatttgcatt 3000
ttcaaatagt tatttgctgg gttaattggt attttagaaa tttcatttac cgttagataa 3060
ataaaataat taaaagacaa agatgtatta ttcaaaagat gattgactag ttggtggtta 3120
tcgactatct taaaatgaaa tttagcatct gattttgttg aaagcatatt aaatattaat 3180
ttttcattt caaaaggcat ctccgaacct tttatctctt ttgtaatatc taacttacta 3240
gatggatacc ttttaagata ttttaatttt gcatctctga actgtctaat tacattatat 3300
ggtttctctg tttctaaaaa agcaataaca aaatatctgt tattaaaatt tttatttta 3360
gttatagttc ctgattcatc tacaaaaagt ctcatcccag ttcctccact ttttttactta 3420
aattatatta tactaattaa gtttgaggaa gtggaacgta tgtacttata attcgaagtt 3480
atgaaaaatc cccccatcaa tataaaacaa aaaagccccc gaaataataa tcgagggcat 3540
taaactaaat cttttttaaca aacttcggtg ttagcagtga gatagtaacc agatttcgtt 3600
ttcaagcgag gtgttccgcc ttttgttttc gccattcctg taatcgtgaa gatagtgcct 3660
accggatatg tgccaccggt tttatgcttc tcagtaaagt ctactgaatt gtatagatca 3720
cactgtacta gtgtttttaac ttttcgcgga ttttctgtgt agtatgtgtt tttgcttgct 3780
ggtgtgtgtg gttttcctgc ttttaacttc gctaataatg ttgtgttctg cgttgctgtt 3840
cctttataat ccttaattcc gtattgattt gctagttttt tacgattcgc aaagctt    3897
```

```
<210> 26
<211> 2702
<212> DNA
<213> Listeria monocytogenes

<400> 26
gatatcgcgc acgtgaatta aacgcagatt ttgcctttt tggtcacccg catgaactag 60
gagtagacat gctagacgac accatcattt taaacccagg aagcatttcc ttaccaagag 120
gacgcatccg tgtcaaaaca tacgctctta tcgattcaac accagaaggc attcaagttc 180
gattcatgga ccgggacgac aacgaactaa cggacctaac ccaaaccttc ccattaacga 240
agcataacta ggtcaaaaga cacccgaaaa agaaaaaatg caataactta aagaaaacca 300
ttgacaaaca agcgatttaa acataaaatg gtatttggct gttgaaaaaa cagtgccatt 360
tgtcctgata gctcagctgg atagagcaac ggccttctaa gccgtcggtc ggggggttcga 420
atccctctca ggacgtaaat agctatatta aagaaatctc taaaacgttg aaaaaccttg 480
atattaaagg ttggatggat gttttagaga ttttttttata tcttataata tctgttttat 540
tccgtatttt tcatgacatt tgtgacaaaa tttgtgctat ttccatccat ttttaatgtg 600
aaaaaagcat ctattttagt ttgattatgt tgatgcaaat tagagcttag attattataa 660
tattttaatg ttattaatat caggttgacc tctcctaagt gttagacatg tttcaccagt 720
ctccatagga gtgtggtagc tgattgcaca gtaattatat actttacgtc aatatcaaaa 780
gcaagtccaa ttaaaatgga ttaccttgcc ccgtaaatga caacttctga aaataggtaa 840
aaggaacaaa agatgatgta attagggtct agtgcatttg tggtgaattt aggttttgat 900
tataatgaga atctccgttt agaggttgtt cttttgaaaa cgatagaagc aattataggt 960
atcgactacc atatattact gaaaaagag ctagattaaa taaaaaaata attctaacat 1020
cataggaggc aattatgact tttttaaaca ccttaaaatt aaatttggaa aatgaaaaaa 1080
agagaatgtt atccgatgct tttatgaaaa aacaagaagg aatcattgta aactatatag 1140
tgacttgcag taaggattct gctattggca ttagtaaaaa ggcaattgat atattattga 1200
taatcaatga aaatacattt cctgaatggc caaatgtaga tagatggctt tctattttgc 1260
caaaatattt tacggattct ttttcaaaat caaaaatatt gcatagtgaa gattggctat 1320
ttgaagagtg gttatactgg tttgaacctg aaaatagatt ttggtttta ggagaattag 1380
atcctgttga taatgagcat ttgaaaataa gcatagttgt acaagaacac ccttttccag 1440
tagaatcatt agaagttcta cttatgaagc taggaacaag cgaattacat gaaattggta 1500
tggaatgagg ttaaatgtac ttttaacggta tatatctttt acaatagagc tgaattttgt 1560
tagagtttaa aatgaaaaaa caactaagtt ataacgaaag gagctaacac ttgatggaaa 1620
attacgtgtc aatagtaaaa atcgaaaaca atctttccgt gtgcttttac aacagctcgg 1680
agaaagtagt agcaattgct aagaaaatga atgagattaa cgaagaagct tatatgcatg 1740
```

```
gttacaattg ggaagcattt ttcaactact atttacctaa atatgctcca gatgtcttag 1800
aaggaatggg ctctgatccg gaagcgggaa tgtatgtggc gtattacacg ctatcacctg 1860
aaactgaggc acgagcagaa aaacttgttc aagtaattac gaatctcatc gaaaatgaag 1920
aactacttta tcaaataatt gaaaatgaag gcaataatat tagttgggat aattaatcct 1980
ttttctaaaa aatccttatc tatttattcg tatagtatta gcaagaggtg aagaacctgt 2040
ataatataat tgacgatatt ttaaagcatt agatcctatt ggcagatgct cttaaaacgt 2100
taaacagtaa aataaaaaat ctctaaaaca tttgaaaccc tttgtaatta aaaggtgaat 2160
gttttagaga ttttttttatc ttgcatttcc catttttatt ccgttgtttt tgtggcaaat 2220
tttattaaaa ctagttcaag taattacgaa tctcattgaa aacgaagaac tactttataa 2280
aatagtcaaa aattaggaca agcagattat tgagatgatt gatcctttac tttaataata 2340
atttttatgt aaactcatcc cttattaggt gttctattgt atgacttgag agtagttttt 2400
ttgagaattt caagcaataa atttaaatat attagagagt ctaaaattag cactaatccc 2460
taaaaagata tgaacgatat gtgaacgatg ataccaagaa atgaaaaaat ttctatacta 2520
tattcaaatt gtaagcttgg gactgctata attagtactt attgaggcga tataatgcca 2580
catacattaa atacagaata aactcattct ttaagataat aattacatct aaggagacta 2640
atcatgaaaa gaaagataag ttctatcatt gtagtcggga taatgttctt tcaatcatta 2700
ac                                                                  2702
                                                                    2702
```

<210> 27
<211> 643
<212> DNA
<213> Listeria monocytogenes

<400> 27

```
agcatttcct taccaagagg gcgcatccgt atcaaaacat acggctctta tcaattcaca 60
ccagaaggca tccaagttcg attcatggac cgagatgaca acgaactatc agacctaacc 120
caaaccttcc cattaacgaa taacgaagca taactaggtc aaaagacacc cgaaaaagaa 180
aaaatgcaat aacttaaaga aaaccattga caaacaagcg atttaaacat aaaatggtat 240
ttggctgttg aaaagacagt gccatttgtc ctgatagctc agctggatag agcaacggcc 300
ttctaagccg tcggtcgggg gttcgaatcc ctctcaggac gtaatatgaa gcgccgtaaa 360
cgttgttaat acaatgttta cggcgctttt tggttttttcg aagttcaaat aaagtacaaa 420
aaatttaaat tccattaatc tttttcatta attatatgta attaggcttc taaagtcatt 480
actatagtgt tttggcccaa tcttaatttt gaagaatata atctttaatt ttggtattag 540
tcttatttag tagcatttgc tccataaaaa caatagaaaa attaatacca gtcttatata 600
aaaatcttct catgacgaga agatttttat tttgcgattg agc                   643
                                                                   643
```

<210> 28
<211> 6123
<212> DNA
<213> Shuttle integration vector pPL2

<400> 28

```
gacgtcaata cgactcacta tagggcgaat tgggtaccgg gccccccctc gaggtcgacg 60
gtatcgataa gcttgatatc gaattcctgc agcccggggg atccactagt tctagagcgg 120
ccgccaccgc ggtggagctc cagcttttgt tccctttagt gagggttaat gacgtcgcta 180
tttaacgacc ctgccctgaa ccgacgaccg ggtcgaattt gctttcgaat ttctgccatt 240
catccgctta ttatcactta ttcaggcgta gcaccaggcg tttaagggca ccaataactg 300
ccttaaaaaa attacgcccc gccctgccac tcatcgcagt actgttgtaa ttcattaagc 360
attctgccga catggaagcc atcacagacg gcatgatgaa cctgaatcgc cagcggcatc 420
agcaccttgt cgccttgcgt ataatatttg cccatggtga aacggggggc gaagaagttg 480
tccatattgg ccacgtttaa atcaaaactg gtgaaactca cccagggatt ggctgagacg 540
aaaaacatat tctcaataaa ccctttaggg aaataggcca ggttttcacc gtaacacgcc 600
acatcttgcg aatatatgtg tagaaactgc cggaaatcgt cgtggtattc actccagagc 660
gatgaaaacg tttcagtttg ctcatggaaa acggtgtaac aagggtgaac actatcccat 720
atcaccagct caccgtcttt cattgccata cggaattccg gatgagcatt catcaggcgg 780
gcaagaatgt gaataaaggc cggataaaac ttgtgcttat ttttctttac ggtctttaaa 840
aaggccgtaa tatccgctg aacggtctgg ttataggtac attgagcaac tgactgaaat 900
gcctcaaaat gttctttacg atgccattgg gatatatcaa cggtggtata tccagtgatt 960
tttttctcca ttttagcttc cttagctcct gaaaatctcg ataactcaaa aaatacgccc 1020
ggtagtgatc ttatttcatt atggtgaaag ttggaacctc ttacgtgccg atcaacgtct 1080
cattttcgcc aaaagttggc ccagggcttc ccggtatcaa cagggacacc aggatttatt 1140
tattctgcga agtgatcttc cgtcacaggt atttattcgg cgcaaagtgc gtcgggtgat 1200
```

```
gctgccaact  tactgattta  gtgtatgatg  gtgtttttga  ggtgctccag  tggcttctgt 1260
ttctatcagc  tgtccctcct  gttcagctac  tgacggggtg  gtgcgtaacg  gcaaaagcac 1320
cgccggacat  cagcgctagc  ggagtgtata  ctggcttact  atgttggcac  tgatgagggt 1380
gtcagtgaag  tgcttcatgt  ggcaggagaa  aaaaggctgc  accggtgcgt  cagcagaata 1440
tgtgatacag  gatatattcc  gcttcctcgc  tcactgactc  gctacgctcg  gtcgttcgac 1500
tgcggcgagc  ggaaatggct  tacgaacggg  gcggagattt  cctggaagat  gccaggaaga 1560
tacttaacag  ggaagtgaga  gggccgcggc  aaagccgttt  ttccataggc  tccgcccccc 1620
tgacaagcat  cacgaaatct  gacgctcaaa  tcagtggtgg  cgaaacccga  caggactata 1680
aagataccag  gcgtttcccc  ctggcggctc  cctcgtgcgc  tctcctgttc  ctgcctttcg 1740
gtttaccggt  gtcattccgc  tgttatggcc  gcgtttgtct  cattccacgc  ctgacactca 1800
gttccgggta  ggcagttcgc  tccaagctgg  actgtatgca  cgaacccccc  gttcagtccg 1860
accgctgcgc  cttatccggt  aactatcgtc  ttgagtccaa  cccggaaaga  catgcaaaag 1920
caccactggc  agcagccact  ggtaattgat  ttagaggagt  tagtcttgaa  gtcatgcgcc 1980
ggttaaggct  aaactgaaag  gacaagtttt  ggtgactgcg  ctcctccaag  ccagttacct 2040
cggttcaaag  agttggtagc  tcagagaacc  ttcgaaaaac  cgccctgcaa  ggcggttttt 2100
tcgttttcag  agcaagagat  tacgcgcaga  ccaaaacgat  ctcaagaaga  tcatcttatt 2160
aatcagataa  aatatttcta  gatttcagtg  caatttatct  cttcaaatgt  agcacctgaa 2220
gtcagcccca  tacgatataa  gttgtaattc  tccgccgctt  gccctcatct  gttacgccgg 2280
cggtagccgg  ccagcctcgc  agagcaggat  tcccgttgag  caccgccagg  tgcgaataag 2340
ggacagtgaa  gaaggaacac  ccgctcgcgg  gtgggcctac  ttcacctatc  ctgcccggct 2400
gacgccgttg  gatacaccaa  ggaaagtcta  cacgaaccct  ttggcaaaat  cctgtatatc 2460
gtgcgaaaaa  ggatggatat  tccgaaaaaa  tcgctataat  gaccccgaag  cagggttatg 2520
cagcggaaaa  gcgctgcttc  cctgctgttt  tgtggaatat  ctaccgactg  gaaacaggca 2580
aatgcaggaa  attactgaac  tgaggggaca  ggcgagaggc  atgcgtggag  ggaaagaaga 2640
acgctgttga  aaaaatcttc  tctggactac  ttgaaacaaa  agaattaaag  tcattttata 2700
aaaaccttga  gaaaaaacat  cttgatataa  aaactattta  taacgaatat  ttatttcaat 2760
gtaataataa  ataatattta  ttattacata  aaatgtttgt  ggtattattt  gtggtatata 2820
tatcctaaat  ggctttatat  cagtgtgtgt  taatccctct  caggacgtta  aatagtaatg 2880
taaagaaatc  tctaaaacgt  tgaaaagcct  tgatattaaa  gggcggatga  atgttttgga 2940
gttttttttta  tatcgtataa  tacccgtttt  attccgttgt  ttttgtggca  tttgtggtaa 3000
gttgtcttaa  attagagctt  agatgactat  agtattttaa  tgttgtatta  atgtcatcat 3060
gaccaagcct  atcagctaca  taaataatat  ccatacccgc  ttctacacat  aagcctgtat 3120
gcgtatgtcg  tagcttgtgt  aatgtcactg  gttcagaatt  gattgtacta  catatcttct 3180
tcaaagcttt  attacaagac  gcgttgtcta  ctggcttatt  gtggtaagtg  atgaataata 3240
acatcaatgg  attcttaata  gcatgttcct  tcatataatc  agtatgccaa  tttaaatacg 3300
aatgtaaata  ttgagcggta  gagttatcaa  tatagatcac  tcgtgatttt  tttgttttgg 3360
tatcaatgaa  tgtattagtg  tacttgtaat  cccaagcttt  attcacagtt  attgaacgtt 3420
tagtgaaatt  aatatccttc  tttgttagtg  caataatttc  ttcgaacctc  atgcctgtct 3480
ggacagctag  aaagataact  gctcgtgata  tagaatgaaa  ttttgcaagt  tcttctaata 3540
gtaaatgaac  tttgtctgtt  tccataaatt  gtgctttatt  tttcgctacg  tcctgtccgc 3600
ttatatgagc  ccctatagtg  gggttttttct  tcatgtaacc  taaatgaaca  gccttgttaa 3660
aaatcgctct  aatttttgcgg  tgtctggtgt  ctacagtgga  tattgcatag  tctacagata 3720
aatgattaat  aaaattgttga  tattgaaccg  catcaatcga  attaagttta  attttttcat 3780
cgaaataatc  aacgaattga  ttataagcaa  gatcgtataa  attaatagta  gattgactac 3840
ttttcccatc  tttaaatgtt  ttcatgaata  gcgtataaaa  ttctttgaag  ttccattctt 3900
tcagagaact  actatcatgc  tgaacttgtt  ttaataattt  agatgcttta  tacattaagt 3960
ttgtttcact  tgtatctgtc  aaacgctttt  ctttccattc  accatcgact  tttatacgta 4020
ggcgaacaca  atatttaccg  tttgctaatt  tttttatctt  cattaatacc  accacctgtt 4080
tattttttgga  gatctttttt  tcagaaaatc  ccagtacgta  attaagtatt  tgagaattaa 4140
ttttatattg  attaatacta  agtttaccca  gttttcacct  aaaaaacaaa  tgatgagata 4200
ataactccaa  aggctaaaga  ggactatacc  aactatttgt  aataattctg  taacagttga 4260
aaagcgaacg  tgtattctta  gggcttgaga  tgtactgctg  ggtaaaccctt  tatagtgtaa 4320
gtgggatgtg  aacgttaatc  aacaactttc  gctatggaa   acctattgtt  ttttgttaat 4380
agaaaaactt  aatacatttg  taatataaaa  accggcagtt  tttccgttct  tcgtgactcg 4440
aaatgaattg  ccagatgagt  ttatggtatt  ctataataga  aggtatggag  gatgttatat 4500
aatgagacag  aattatgatg  atcgaaagct  agcttggcac  tggccgtcgt  tttacaacgt 4560
cgtgactggg  aaaaccctgg  cgttacccaa  cttaatcgcc  tggccgtcgt  ttacaacgt  4620
gccagctggc  gtaatagcga  agaggcccgc  accgatcgcc  cttcccaaca  gttgcgcagc 4680
ctgaatggcg  aatggcgcct  gatgcggtat  tttctcctta  cgcatctgtg  cggtatttca 4740
caccgcatat  caaatggttc  ggatctggag  ctgtaatata  aaaaccttct  tcaactaacg 4800
gggcaggtta  gtgacattag  aaaaccgact  gtaaaaagta  cagtcggcat  tatctcatat 4860
```

```
tataaaagcc agtcattagg cctatctgac aattcctgaa tagagttcat aaacaatcct 4980
gcatgataac catcacaaac agaatgatgt acctgtaaag atagcggtaa atatattgaa 5040
ttacctttat taatgaattt tcctgctgta ataatgggta gaaggtaatt actattatta 5100
ttgatattta agttaaaccc agtaaatgaa gtccatggaa taatagaaag agaaaaagca 5160
ttttcaggta taggtgtttt gggaaacaat ttccccgaac cattatattt ctctacatca 5220
gaaaggtata aatcataaaa ctctttgaag tcattctttta caggagtcca aataccagag 5280
aatgttttag atacaccatc aaaaattgta taaagtggct ctaacttatc ccaataacct 5340
aactctccgt cgctattgta accagttcta aaagctgtat ttgagtttat caccccttgtc 5400
actaagaaaa taaatgcagg gtaaaattta tatccttctt gttttatgtt tcggtataaa 5460
acactaatat caatttctgt ggttatacta aaagtcgttt gttggttcaa ataatgatta 5520
aatatctctt ttctcttcca attgtctaaa tcaattttat taaagttcat ttgatatgcc 5580
tcctaaattt ttatctaaag tgaatttagg aggcttactt gtctgctttc ttcattagaa 5640
tcaatccttt tttaaaagtc aatattactg taacataaat atatatttta aaaatatccc 5700
actttatcca attttcgttt gttgaactaa tgggtgcttt agttgaagaa taaagaccac 5760
attaaaaaat gtggtctttt gtgtttttttt aaaggatttg agcgtagcga aaaatccttt 5820
tctttcttat cttgataata agggtaacta ttgcccagat ccgaaccatt tgatatggtg 5880
cactctcagt acaatctgct ctgatgccgc atagttaagc cagccccgac acccgccaac 5940
acccgctgac gcgccctgac gggcttgtct gctcccggca tccgcttaca gacaagctgt 6000
gaccgtctcc gggagctgca tgtgtcagag gtttttcaccg tcatcaccga aacgcgcgag 6060
acgaaagggc ctcgtgatac gcctattttt ataggttaat gtcatgataa taatggtttc 6120
tta                                                                6123
```